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INTRODUCTION

As a country, the United States has a higher infant mortality rate than most of our developed counterparts and close to several developing countries such as Croatia, Kuwait, and Costa Rica ("CIA," 2013). As a state, Wisconsin has an infant mortality rate that ranks in 19th place out of the 50 states. According to the *Milwaukee Journal Sentinel*, Milwaukee's rates are worse today than most of the country's most troubled regions, including Harlem, which once also suffered shocking rates (Causey, 2011). This was not always the case. Prior to the 1960's, during a time when Milwaukee experienced high industrialization and a well-off economy, infant mortality rates were one of the best in the country. Milwaukee is now ranked as the 7th highest in infant mortality rate of 53 of the largest cities in the U.S. Milwaukee's shockingly high infant mortality rates has gotten worse, especially among some communities ([Y] Stephenson, 2011). Why is this? What is being done to address it? What still needs to be done? This is the focus of this research.

In Milwaukee, there are significant disparities evident between blacks and whites for which blacks have substantially higher infant mortality rates than whites, thus being a main contributor to the high rates. Infant mortality rates are calculated as the number of deaths of infants under the age of one year in a given year per 1,000 live births in the same year. Infant mortality rates impact so many factors in a community that it has been a rate used for social measures. For example, the infant mortality rate can measure the overall well-being of one community. Poverty, ignorance, marginalization, and lack of public services prevail in areas with high infant mortality rates, thus implying these areas have higher vulnerability. Where infant mortality is high, there may also be a lack of education, community programs, health initiatives, and poor living conditions. This is the case behind infant mortality in Milwaukee. The highest

rates are correlated with particular zip codes regarding STDs, teen pregnancies, poverty, and even areas with minimal access to adequate food. According to the Milwaukee Health Department (2012), the top three reasons for infant mortality in Milwaukee are premature birth, birth defects, and SIDS (sudden infant death syndrome)/SUDI (sudden unexpected death in infancy) attributed to unsafe sleeping. Infant mortality is important to address as a public health issue with broader economic and social interventions needed.

Stress leads to preterm births, the latter of which is one of the three main causes of infant mortality in Milwaukee. Since infant mortality rates are high for African American women, it is important to acknowledge stress triggers that are leading to high cortisol levels, which are associated with preterm births. Stress can be impact a woman passively or actively. Passive stress can induce physiological changes like elevated cortisol levels. Actively, stress can cause unhealthy behaviors such as smoking, drinking, use of drugs, and violence. Consequently these stress triggers can lead to congenital abnormalities for the baby like heart defects, in addition to the possibility of a preterm birth. Several studies have determined factors such as poverty, single parenting, lack of a job, living in a dangerous neighborhood, and discrimination, which all lead to high levels of stress for African Americans. If stress is leading to preterm births, again the main reason behind high infant mortality rates, one of several measures must be taken to address stress of women during their pregnancy. According to a data set in the *Milwaukee Journal Sentinel* series in 2012, Wisconsin ranks the highest in the number of women who smoke cigarettes during their pregnancy and smoking rates are a measure of stress. Another cause of Milwaukee infant deaths are sleep-related reasons. It is important to evaluate these reasons. Issues may include many mothers not being able to afford a crib, or who live in small living unit with too many people, or have no other choice but to sleep with their child because one bed and a

roof is all they have. In other words, economic change and poverty, both which are associated with deindustrialization, are elements which play a role in issues of stress and sleep related causes if infant mortality. These issues are addressable, preventable and thus, unacceptable.

In short, the primary causes of infant mortality rates are preterm births, SIDS, and deformities. But behind these immediate causes are deeper triggers that this paper will examine. Reasons behind the main three causes include socioeconomic change due to deindustrialization that lead to social breakdown, poor behaviors, and biological changes. Furthermore, racism and segregation, as well as health system failures, may also be causes of Milwaukee's high infant mortality rate.

Milwaukee will be compared to Costa Rica in this research. Costa Rica is a developing country that has experienced infant mortality rates comparable to Milwaukee's infant mortality rates since the beginning of the 21st century. Although the rates were similar in the 1990's, Costa Rica managed to decrease its rate substantially. Today, Milwaukee's rates are far worse. Considering Milwaukee is in one of the world's most advanced and richest countries, not to mention the U.S has the highest expenditures on health care, the high infant mortality rates compared to a developing country's rates are incomprehensible. There are few cross-national studies analyzing infant mortality rates focusing on health concerns with a developing country versus a high risk city such as Milwaukee; therefore, this research will compare Milwaukee and Costa Rica on infant mortality rates. Costa Rica was chosen as the developing country to use as a contrast case. As previously mentioned, it has had similar infant mortality rates as Milwaukee until the mid-2000s, when Costa Rica's rate improved and Milwaukee's rate dropped. However, Costa Rica is a contrast with Milwaukee as it has implemented social programs which have contributed to the accomplishment of reaching its lowest infant mortality in history as of 2012

(Diario Digital Nuestro País, 2013). Costa Rica's infant mortality rate is now lower than Milwaukee's rate. Examining a developing country capable of addressing its high infant mortality rates can reveal information valuable and useful towards Milwaukee.

Analyzing a country that has shown substantial improvement in regards to their infant mortality rates may help reveal potential solutions for Milwaukee. This can be done by analyzing differences in Milwaukee and Costa Rica within stressors, socioeconomic factors, access to care, and culture. An analysis controlling for race will reveal new contributing factors such as economic change leading to high infant mortality rates. This is my first hypothesis. Although I will attempt to control for race, considering the wide gap between blacks and whites in Milwaukee along with the discrimination in Costa Rica within immigrants, indigenous, and Costa Ricans, excluding race may be inevitable. Nonetheless, a developing country that shares infant mortality rates with a city considered more advanced is worth analyzing.

The disparities in Milwaukee regarding infant mortality rates are targeted as an integral subject that needs attention. Health officials have been trying to figure out the direct cause behind high infant mortality rates among blacks; for example, socio-economic status has been analyzed. However, it was found that African-American women of high income are still three times more likely than a white woman of lower class to endure high rates of infant mortality. This goes the same for education, where an African-American woman with more than a high school education has higher chance of facing infant mortality than a white woman with less than a high school education. Gaps within the rates of blacks and whites are now being blamed on high cortisone levels triggered by stressors. Stressors for blacks are triggered by factors experienced everyday such as discrimination, financial hardships, living in a dangerous neighborhood, and high rates of incarcerations dense within the African American community.

While this is a factor that most likely contributes significantly to high infant mortality rates amongst blacks, I would like to contribute to this research to find further reasoning. Milwaukee is not the only city in the U.S with high infant mortality rates. There are other cities that may or may not have other or the same factors to blame for high infant mortality rates. By this I mean Milwaukee's rates may be due to stressors shared by a particular community while another city's high rates may involve additional factors, such as barriers in access to care. To accomplish this research, I will make a comparison of infant mortality rates between Milwaukee and cities in Costa Rica, such as Cartago with 11.7 deaths per 1,000 live births and Puntarenas with 10.71 deaths per 1,000 live births, both as of 2010 ("Ministerio de Salud," 2013). Such rates closely compare to those of Milwaukee. I would like to explore other potential reasons behind such high rates that are yet to be acknowledged or considered. I would also like to contribute to the findings of the Wisconsin Department of Health Services and studies by *Milwaukee Journal Sentinel* journalists such as Crocker Stephenson. I close with my second and final hypothesis, which states that infant mortality in Milwaukee is due to preventable causes. Revealing new factors about infant mortality rates can help tackle the shockingly high rates with policy intervention that address broader economic factors.

BACKGROUND & SIGNIFICANCE

Definitions

Many definitions will be provided at the end of this paper; however, some concepts need elaboration. Infant mortality has a standard definition across various reports, journal articles, data and other sources, although some are more specific than others. In this context, I will use the definition by the City of Milwaukee's Health Department (2012)-"Infant mortality is the number of infants who die during their first year of life. Infant mortality is measured by the Infant Mortality Rate, which is the number of infant deaths per live births." I use this measurement as

well because most data found from both Milwaukee and Costa Rica was expressed in such form. Although Milwaukee's top causes of infant mortality include SIDS/SUDI and Costa Rica's does not, both share congenital anomalies and premature births as some of its top causes. Congenital abnormalities will be used in this context as malformations or prenatal diagnosis involving physical defects of a baby. These defects can be external or internal affecting major organs such as the heart and brain. Some studies show congenital abnormalities are related to food fortification and folic acid supplementation (Adams, Alexander, Kirby, Wingate, 2009, p.182). Lastly, premature or preterm births will be used defined as birth of a baby less than 37 weeks of gestational age. The length of gestation, maternal health, uterine conditions, and anything to a child prior to birth or after will determine a premature birth. After the baby is born preterm, its survival depends on fitness, environmental exposure, infant maturation, and care (Adams et al., 2009, p 193). A quick reference of definitions is available at the end of this paper.

Health in developing countries versus developed countries

Developing countries differ greatly from the U.S far more than their level of development. Developing countries struggle from fewer infrastructures and a weaker economy. As a result, these developing countries are more likely to experience more preventable matters than much more developed countries. Public health of developed and developing countries contrasts substantially in problems and policy interventions. Nonetheless health is affected by social and environmental factors in all countries. Public health is "…concerned with the health of specific communities and populations, emphasizes the socioeconomic determinants of illness, and prioritizes preventative care" (DeLAET & DeLAET, 2012, p.4). In addition to the obvious health factors, public health includes safety, clean air, sanitation, education, and clean water. The people's health goes beyond biological factors: it also involves social factors. The health of a

region's population will be greatly determined by the amount of social capital contained by that region. Such social capital includes a range of economic, cultural, and personal resources. This information would suggest that if Milwaukee has an unstable economy, limited health care, and limited living necessities, then it lacks social capital and therefore Milwaukee's inhabitants will struggle to have good health. Debra and David DeLAET say scholars call these external factors, such as the physical environment, health access, socioeconomic status, and education-social epidemiology factors. It is important to provide a background on what public health entails and how it is interpreted in order to understand the trends in Milwaukee versus Costa Rica.

The social epidemiology of Costa Rica and Milwaukee in regards to health will be the main focus of this research. More specifically speaking, factors specific to race and ethnicity will be examined. Race specific factors are attributed to social factors although they differ in different countries. For example, residential segregation and institutionalized discrimination go hand in hand with poverty and education. In the U.S, Hispanic and African America children are more likely to develop asthma than other races due to the likelihood of living in public housing and resulting in exposure to asthma triggers such as cockroaches (DeLAET & DeLAET, 2012, p 101). Inequalities also exist in countries with universal health care for the disadvantaged racial and ethnic populations.

In developing countries, even working in agriculture can influence the quality of health for certain communities. Working in agriculture during a pregnancy can be dangerous due to pesticide exposure (Arias & Tristan, 2000-2001).In contrast, in a developed country, a woman who lives next to the highway is more likely to experience an infant death than a woman who lives in a rural area because there is more exposure to air pollution, according to *Milwaukee Journal Sentinel* reporter Crocker Stephenson (C. Stephenson, personal communication, July 8,

2013). In both developing and developed countries, neighborhoods with poor access to food will foster more inhabitants likely to suffer from diabetes or obesity. Also, the disadvantaged such as the poor, are more likely to be prone to violence which can affect one's mental health and choice of bad habits like smoking. In developing countries, indigenous groups are the majority of the disadvantaged populations who apparently, "…tend to experience higher injury and death rates due to accidents associated with cramped living conditions, unsafe housing, lack of space and facilities for safe play, and exposure to a high volume of fast-moving traffic" (DeLAET & DeLAET, 2012, p 101). Similar to factors experienced in developing countries, many of these experiences prevail in what is considered a developed country with more stability.

EXISTING LITERATURE

In the last couple of years, Milwaukee has launched several campaigns against high infant mortality rates. Campaigns like "Strong Baby," initiated in 2012, and the *Milwaukee Journal Sentinel's* "Empty Cradles" project, a series on the infant mortality problem in Milwaukee initiated in 2005, have raised awareness in the public about the issue. The "Strong Baby" campaign included ads on billboards and bus stops that showed babies lifting furniture. Infant mortality rates are so high that the Milwaukee Health Department has committed to addressing the public health issue, promoting immunizations, access to prenatal care, educating women on reproduction, and even hosting crib drives for safe sleeping ("Milwaukee Health Department," 2010). Studies of infant mortality rates have been conducted as well as shared by *Milwaukee Journal Sentinel* journalist and lead reporter of the "Empty Cradles" series Crocker Stephenson and the Milwaukee Health Department. Further, Health Commissioner Bevan Baker has taken the initiative to lead campaigns and speak about the issue, raising awareness around the Milwaukee community, along with Mayor Tom Barrett. In addition to providing information on

Milwaukee's public health in regards to high infant mortality rates, the correlation of the high rates with Milwaukee residents of socio-economic status is also analyzed by the *Milwaukee Journal Sentinel* in its "Empty Cradles" series. So far, Milwaukee's ads have helped educate mothers on providing their infants with healthy living conditions. This was done by first recognizing causes of death and then finding ways to teach mothers about dangers from poor habits such as sleep-related issues or triggers that may lead to premature births. My research will attempt to reveal what is yet to be acknowledged based on the investigations recently conducted in Milwaukee. These findings will be accomplished by making the comparison between Milwaukee and Costa Rica.

Studies have been conducted on infant mortality rates on African-Americans, looking at genetics to determine whether it has been a contributing factor. Genetics are not a factor; however, bad habits like smoking and a burden of poverty may be a cycle consistently endured by a family. Other studies within the United States in Ohio and Washington D.C analyze infant mortality rate disparities between whites and blacks (Schmid, 2011). A comparison of China was made based on its industrial development while considering Milwaukee's moment of industrial deterioration. The study revealed that when industrialization was high in Milwaukee, infant mortality rates were low but high in China. Once deindustrialization occurred in Milwaukee, industrialization boomed in China and infant mortality rates dropped in China and increased in Milwaukee (Schmid, 2011). Even Brazil has researched racial disparities contributing to public health concerns, including infant mortality. As far as Costa Rica is concerned, articles published by the *Ministerio de Salud*, or Health Ministry, have helped educate and inform their public about the efforts towards decreasing the infant mortality rate. I was only able to come across two studies on Costa Rica's infant mortality. Luis Rosero-Bixby released a study on the declining

rates during the 1980's. This study helped contribute to a substantial part of the Costa Rican portion of this paper, as it revealed the country's economic and social circumstances from the 1970's-1980. The second study was conducted by Doctors Arias and Tristan in 2000; they studied the shockingly high infant mortality rates in San Pablo de Heredia, Costa Rica's most developed city at the time (Arias & Tristan, 2000-2001).

RESEARCH DESIGN

Methods

This comparative case study will use qualitative and quantitative data. The comparison will begin with analyzing Costa Rica and its infant mortality rates. Costa Rica endured very high infant mortality rates prior to the 1970's. These rates began to decline significantly and circumstances improved after implementing better primary and secondary health care policies. Ironically, socioeconomic factors had the least impact on the infant mortality rate decrease. Instead, policy interventions in public health and access to primary health care made a bigger difference. In Milwaukee, by contrast, deindustrialization played a significant role. This deindustrialization will be studied for this paper to later conclude how a deteriorating community can be harsh enough to impact a city's infant mortality rates. I examine the changes made by Costa Rica that explains the decline after the 1970's. By 2012, Costa Rica reached its lowest infant mortality rate in its history after implementing social programs and universal health coverage. I then research Milwaukee's history of infant mortality rates to match the same time frame as Costa Rica's to determine its patterns from the fluctuating rates. The three top causes for infant mortality in Milwaukee are 1) Premature births, 2) SIDS/SUDI, and 3) Deformations/Congenital abnormalities. I analyze different social circumstances during those times such as policies, the economy, and education levels. Then, I attempt to draw inferences

based on the studied social factors that are contributing to the top three causes of high infant mortality.

My research begins to unfold once I start to make comparisons between the circumstances in Costa Rica and Milwaukee. In addition to previously mentioned factors, I will also analyze the socioeconomic factors, and distribution of resources to health facilities and civilians, community participation, types of households, employment levels, peer pressures, individual attitudes, and health literacy, which is the strongest health status predictor more than age, income, education level, or racial group of both regions ("CDC," 2013). According to the CDC, health literacy is defined as the capacity to obtain, process, and understand basic health information and services to make appropriate health decisions.

In the provided background, I briefly discuss the importance of infant mortality rates after providing a definition that fits "infant mortality rates (IMR)" the way it is used throughout this paper. Additionally, I provide definitions of the causes such as "preterm births" and "congenital abnormalities" in order to establish one standard meaning among all readers of this study. Lastly, I provide background information on the public health shared throughout developing countries; for example, by mentioning its scarcity of resources such as sanitation and vaccinations. This is accomplished including the inequalities which exist in the U.S based on the works of David and Debra DeLAET *Global Health in the 21st Century*.

I address Milwaukee's infant mortality rates through secondary sources such as collected data. Most of the information is recent and I derive it from *Milwaukee's Journal Sentinel* ongoing series "Empty Cradles" that has followed the infant mortality issue since the time it has elicited attention and became a highlight around 2005. In addition, I conducted interviews with *Milwaukee's Journal Sentinel* reporter Crocker Stephenson. I make use of

secondary sources and primary sources to hone existing findings and any details lacking review. Further, I will use census data, articles by Costa Rican writers such as Costa Rica's heath ministry and articles from *Journals of Public Health*, the book *Understanding Health Policy* by Thomas Bodenheimer and Kevin Grumbach, and websites like that of the Milwaukee's City Health Department, to collect statistical information. I will allot extra time on the research done for Costa Rica as many of its published works are in Spanish and will need to be carefully translated.

Research subject/population

My approach to this research topic is to make a comparison of Milwaukee rates to those of a less developed country, and to explain why Milwaukee's rates are higher than that country. For this research I will narrow the comparison down to Milwaukee and Costa Rican cities where rates are comparable, such as Cartago or Puntarenas. In infant mortality rates, Costa Rica ranked 151st, 22 ranks better than the U.S. In comparing Costa Rica to Milwaukee however, the infant mortality rates are fairly close. Rates for the city of Milwaukee rates are 9.7 deaths per every 1,000 live births (Milwaukee Health Department 2013). In Costa Rica, rates have reached its lowest in history at 8.5 deaths per every 1,000 live births (Diario Digital Nuestro País, 2013). Further, Cartago's and Puntarenas's rates are also close to those of Milwaukee. I will be comparing Milwaukee, for which blacks have higher rates of infant mortality, to a primarily Latin country. Costa Rica fosters racial and cultural homogeneity. This approach is intentional, as I want to control for race for at least part of the research, since completely disregarding race will dismiss the African-American community that holds the highest infant mortality rate. I am taking this approach in an attempt to reveal outside factors not correlated solely on race, but also societal elements.

Treatment of data

This research will be oriented to an audience of professionals and students interested in public health concerns and most especially for Milwaukee locals. Additionally, I will target those individuals who are already addressing the infant mortality crisis through campaigns and other endeavors. Once my research is complete, I will present to an audience in colloquia and potentially conferences. Considering I plan on applying for graduate schools of public health, I hope this research can serve as a self-endorsement for my future studies.

My research will impact Milwaukee's society as it will hopefully reveal new contributing factors to high infant mortality rates, especially in the areas where IMR are the highest. The zip codes of 53205, 53206, 53210, 53216, and 53218, are areas with the city's highest rates. If new factors are discovered involved with babies dying before the age of one, the information can be correlated with factors from each of these zip codes. Once such information is disseminated, authorities can proceed with their campaigns and potentially come up with new approaches. Approaches made in Costa Rica that led to declining infant mortality rates may also be duplicated if they can be applicable in Milwaukee

Limitations of this study

There were a few limitations I encountered throughout the research. I was able to study the industrialization and overall economy of Milwaukee prior to the 1970's. Causes of earlier infant mortality rates for Costa Rica were found thanks to the study conducted during the 1980's by Rosero-Bixby. The study also revealed earlier economic and social circumstances in Costa Rica; however, no information was found on any SIDS/SUDI causes occurred in the country like they were for Milwaukee. Additionally, infant mortality rates divided specifically by Costa Rica's ethnic groups were not found. This may be due to the cultural homogeneity the country

fosters. It also reveals the tendency the U.S has to continue to emphasize statistics according to racially categorized demographics. This research is being completed over a constricted time frame allowing for little time to conduct interviews with professionals overseas, as done in Milwaukee, and less time to elaborate on every social factor discussed. With more time, I would have researched Costa Rica's universal health care further to determine whether minority groups like the indigenous have higher infant mortality rates due to inequalities of health care coverage. Overall, I need more data on Costa Rica, but I could find more if I continue this research in the future. This is a research topic I can potentially further unfold in the future by analyzing rates throughout future years, evaluating programs recently implemented to reduce rates, and by following set goals and whether or not they are ever met.

Summary of research design

It should be noted that Costa Rica's IMR was very high prior to the 1970's and has declined ever since. Milwaukee, on the other hand, had better rates than today. It is to our benefit to consider a country with rates currently better than Milwaukee's and a country that has defeated a period of an infant mortality crisis. My research uses Costa Rica as model; however, the real impact is oriented to Milwaukee's society. My research is conducted by analyzing recent findings of today's high infant mortality rates in Milwaukee and findings on today's low rates in Costa Rica after the research done on the rates for both regions since the 1970's. In addition, the special series on infant mortality in metropolitan Milwaukee, "Empty Cradles" by the *Milwaukee Journal Sentinel*, is closely studied. To recapitulate on the entire research process I can divide it in three stages.

- **Stage one:** Thoroughly study social and economic status from the 1970's to 2012 for Costa Rica and Milwaukee. Determine the infant mortality rate for each region through

the mentioned time frame along with the efforts that have been taken to address the shocking rates in Milwaukee in recent decades.

- **Stage two:** Closely analyze the three main causes of infant mortality for Milwaukee and dig deeper to figure out what societal factors such as access to care, socioeconomic changes, poverty, and racial discrimination/segregation are leading to the three top causes. This will be accomplished with the two conducted interviews and an evaluation of *Milwaukee Journal Sentinel's* "Empty Cradles" series and a similar analysis for Costa Rica.
- **Stage three:** Tie the findings for Costa Rica and Milwaukee together in comparison form while mentioning the approaches Costa Rica took, and Milwaukee did not, that led to a decline in its infant mortality rates. I stress the policy responses for Costa Rica and Milwaukee. I then close with what has been done, what needs to be done, and what the future holds for Milwaukee as far as its infant mortality rates are concerned. The final step will be to finalize this paper and to develop a respectable poster that presents and summarizes the finding of this summer's McNair research.

The final findings and data on the comparison will be shared in colloquiums hosted by Marquette. In addition, I hope to publish the information to bring it to the attention of the Milwaukee Health Department.

FINDINGS

Milwaukee

Milwaukee has a population of just fewer than 600,000 people, according to the U.S census. It suffers a devastating infant mortality rate of 9.7 deaths per 1,000 live births, according to the Milwaukee Health Department, as of 2011. The rate for African Americans is even more

detrimental, at 14.5 deaths per 1,000 live births as of 2011, according to a graph in the *Milwaukee Journal Sentinel* in 2012. The infant mortality rate gets even higher especially in concentrated zip code areas. For example, the 53210 area, one which is near St. Joseph's Hospital, is currently one of the top five most at risk areas, holding a rate of 17 deaths per 1,000 live births for all residents. This rate has its causes behind the occurring infant deaths; however, the reasons for its causes are yet to be accurately and precisely explained. Although Milwaukee has suffered high infant mortality rates for several years, it was not until 2005-2008 when the rate was at 11 deaths per 1,000 live births that the issue gained attention. These high rates did not always prevail. Similar to Costa Rica's history, Wisconsin overall had one of the nation's best infant mortality rates. According to a *Milwaukee Journal Sentinel* article in the "Empty Cradles*"* series, "From 1979 to 1981, Wisconsin's black infant mortality rate averaged third best in the nation. By 2003 to 2005, the three-year average dropped to the second worst" (Stephenson, 2011). Since the 1990's, rates have remained within a range of 9.2-12.9 deaths per 1,000 live births across all races.

Infant mortality rates in the African-American Community

Before the period of low rates around 1950-1960, many African-Americans migrated to Milwaukee from the South because many jobs were available with high wages for low-skilled workers. In addition, the rate of African-Americans living in poverty was 8.4% but that rate grew to 46.7% in 1990 (Callaghan and Levine, 1998). According to Schmid (2011), "In 1970, the city's median family income for African Americans was 19% higher than the U.S median income for black families. Today, it's 30% lower." Schmid continues to refer to the change in Milwaukee stating "the overall rates of poverty and unemployment in 53210 tripled" (Schmid, 2011). By the 1990's, coincidently, factories were sold, closed down, or outsourced overseas.

Worsened poverty and unemployment rates resulted in higher stress levels, which consequently connect to higher infant mortality rates, especially in the 53210 zip code area. In a city that was once highly industrialized with a population mainly made up of the middle class, it is important to evaluate the city's changes and current circumstance in order to figure out how to address the IMR epidemic. In addition, it is worth understanding how it is possible for a developing country such as Costa Rica to have a lower infant mortality rate than a city in the U.S that is supposedly more advance and economically stable.

It is clear that the Milwaukee infant mortality rate is high and what contributes to this rate is the high number of African-Americans in poverty. The rate for African-Americans is about three times the rate for whites. Examining the causes of Milwaukee's infant mortality rates helps see why. The three top causes behind the current infant mortality rates include congenital abnormalities, sleep-related death or SUDI/SIDS, and the number one reason, preterm birth complications. The cause of preterm births has been a primary cause across all races. According to the FIMR report, a report that summarizes factors contributing to high infant mortality rates in efforts to reduce the IMR and eliminate racial disparities (FIMR, 2010), between 2005 and 2008 53.7% of infant deaths were due to complications of prematurity. Many may suggest preterm birth triggers can be caused by many factors such as older maternal age and diabetes. While this may be true, several studies have found that its triggers go beyond the physiology. The main trigger leading to preterm births, that is births occurring at 37 weeks of gestation, is stress. High levels of stress are affecting primarily African-American woman who are Milwaukee residents. The stress triggers are coming from social factors, some unique to the Milwaukee community.

An interview with *Milwaukee's Journal Sentinel* reporter Crocker Stephenson was conducted and after being asked what stress factors are unique to Milwaukee that African-

American women do not experience in other cities, he explains that Milwaukee is a particularly racist city in a masked way. By this he meant Milwaukee lacks good conversation on race and racism which in turn leaves a heavy masked burden on Milwaukee's women. Additionally, Stephenson mentions Milwaukee also has a high incarceration rate, especially for black males. More specifically, he notes the high rate is almost three times higher than most large cities. As a result, fathers are taken away, later unable to find employment, and thus disenfranchising communities. Women are then forced to be single mothers. Again, most of these communities lack progress and show stagnation, like the zip code 53210. The zip codes with the highest rates have the most poverty, lowest graduation rates, highest premature death rates, and high rates of sexually transmitted diseases such as HIV and Chlamydia, and high teen birth rates. Most of these contribute to high levels of stress and thus higher preterm rates. Additionally, stress factors are derived from living in a dangerous neighborhood. The neighborhoods are dangerous as a result of increased crime rates invoked by poverty and unemployment associated with deindustrialization. For instance, if a woman is forced to walk through her dangerous neighborhood from the city bus to her house, the fear stimulates stress. Daily racial discrimination experienced in the workplace or simply at a store can cause stress that may later accumulate and consequently increase levels of the stress-causing hormone cortisol. As a result, a woman's chances of giving birth to a preterm baby also increase. Aside from an area's violence, a lack of proper nutrition in these areas becomes an issue and a contributing factor to preterm births. The reason for this is because poor nutrition can lead to diabetes or obesity, also factors that can trigger preterm births. The troubled areas had many women who lacked adequate prenatal care due to low health literacy and poor access to proper nutrition. There is almost a never ending cycle because if a woman had a preterm birth in her past, the likelihood of having

another is high. As long as the contributing factors prevail and are uncontrolled, lowering Milwaukee's infant mortality rates will be a challenge.

Sleep-related deaths are also a common contributor to Milwaukee's high infant mortality rates. According to the Milwaukee Health Department (2012), 48 of Milwaukee's infant deaths included the following: sleeping on or near adult pillows or with blankets, quilts, or stuffed animals. Some babies were sharing a bed with a parent, other children, or a caregiver. Other babies were exposed to second hand smoke in their homes. Some had been placed on their stomachs or sides to sleep, caregivers were using drugs or alcohol at time of infant's death, and some babies were sleeping on a couch, chair, car seat, or swing. There have been several studies and analysis on the reasons behind the sleep-related deaths which have occurred. It is important to mention, smoking and drinking are usually behaviors resulting from stress, again leading to preterm births. Interestingly enough, many investigations concluded that the most of the households showed evidence of smoking and alcohol activity occurring during the time of the infant's death ([X] Stephenson, 2010). There is yet to find a correlation between the poor behavior and chances of sleep-related deaths amongst infants.

The poor living conditions many woman endure also makes an infant residing there at a high risk for dying due to a sleep-related reason. If a woman lives in a one bedroom apartment with her two children and shares a bed with them, there is a significant potential for the baby to suffocate or sleep in an inappropriate position. No generalization is being made suggesting that one bedroom homes are unsafe for babies. However, if a mother is forced to live in constrained living conditions, there is a high chance for SUDI/SIDS. There is no information on the frequency for which sleep-related deaths are occurring (C. Stephenson, personal communication, July 8, 2013). In other words, the number of people who sleep with their infant and whether it is

related to how they live or if they practice unhealthy habits such as drinking is unknown. The stories studied for this research in the "Empty Cradles" series had many similarities nonetheless.

Most of the infant deaths were a result of multiple factors. Addressing these issues related to sleeping activity, without any other move, can help decrease the infant mortality rate significantly. In fact, according to reporter Crocker Stephenson, eliminating sleep-related deaths can help reach the state's goal of decreasing the infant mortality rate amongst African-American by 15 per cent (C. Stephenson, personal communication, July 8, 2013). This is a goal set by Mayor Tom Barrett and Bevan Baker for which they hope to accomplish by 2017 ("Milwaukee Health Department," 2012).

African-Americans are constantly a highlight within the provided data because of high, unacceptable rates. In addition it is to the advantage of other racial groups to consider the information as applicable to their own group in the future if not addressed. Recently, there has been a decline in rates amongst the white population in Milwaukee, causing a wider disparity between African-Americans and whites since African-American rates have remained. Although there is not a certain reason why this has occurred, several factors may have contributed to this. One reason for example may be attributed to advancing medical technology. Most infant deaths amongst whites are caused due to congenital abnormalities, unlike its counterparts that have preterm birth as its more common reasoning. Access to advance technologies able to better treat congenital abnormalities can be attributed to declining white rates. The technologies are not inaccessible to blacks. There is no discrimination involved in the use of certain ailments and technology and in the state of Wisconsin, every pregnant woman, regardless of age or race, receives medical insurance (C. Stephenson, personal communication, July 8, 2013). Health coverage is not necessarily the issue.

Issues of access to care

Medicaid is most likely to cover individuals in the high-risk zip code areas since it is coverage for some living in poverty (Bodenheimer & Grumbach, 2012). Many of the high risk zip code areas foster most of Milwaukee's major hospitals but the problem is that there are not enough providers who accept Medicaid insurance because of Wisconsin's low reimbursement rates ([W] Stephenson, 2011). More information on Medicaid is provided in the "policy" section of this paper. This situation has led to more congested clinics and lower quality of care. In addition, inequalities between those insured by Medicaid and those privately insured exist. As a result, although health resources and facilities are available, they are not completely accessible. Making access to care a challenge is another stress trigger for women. In addition, it delays timeliness of prenatal care.

Another issue involves a lack of health literacy. Women who may not understand medical terminology will leave the provider with little information and improperly given directions. A black woman who is poorly educated and single may experience a different doctor's appointment than an educated white woman accompanied by her spouse. The black woman would be more likely to take the doctor's advice without asking for alternatives or inquiring about more information. She would take the doctor's superiority and power seriously, thinking the professional knows best. A loss of autonomy occurs. On the contrary, the white woman may receive orders while the spouse asks for more information to have some input due to their own knowledge or experiences. African-Americans have fewer interactions with providers similar to the interactions that occur between providers and whites (C. Stephenson, personal communication, July 8, 2013). There may also be reluctance in culture due to practices or a language barrier with those of the Latino race; however, I use African-Americans as the subjects

in this case since the most high-risk areas have mostly African-American residents with high rates of getting the lowest education ([Z] Stephenson, 2013).

Issues of access to dental care

Not seeing caregivers often is especially true for African-Americans regarding their dental care. Badgercare is Wisconsin's Medicaid and many may blame hospitals and clinics for not accepting such insurance, being placed on a waiting list, or getting less qualitative care. This is a problem especially for pregnant women on Medicaid who may need more immediate attention (C. Stephenson, personal communication, July 8, 2013). A bigger issue exists in an area one would least expect, dental care. Dental health is actually a significant factor of preterm birth when there is an infection. A hormonal change a pregnant woman endures makes gums more susceptible to infections. According to the *Milwaukee Journal Sentinel*, Wisconsin is 5th in the country for the lowest reimbursement ([W] Stephenson, 2011). There are 55 dental clinics in the city accepting Badgercare plus only 8 accepting new adult Badgercare patients, some booking patients for two to three months out ([W] Stephenson, 2011). If women are waiting to see a dentist for the first time until they are pregnant and suffering an aching tooth, there is an issue because now the baby is at risk along with the mother. Although access to hospitals is available, Wisconsin's poor dental care is highly correlated with poor access to prenatal and postnatal care by women on Medicaid ([W] Stephenson, 2011). The issue is not just for dental care. Many providers simply do not accept Medicaid insurance because of the low reimbursement rates.

Medicaid and health policy intervention in the United States and in Milwaukee

Similar to the way Milwaukee's infant mortality rates began to worsen, so did the nation's health policy. Health insurance in the U.S was primarily accessible through employers

or the government for particular populations. Employers provided their employees with full or part health coverage while the poor and elderly had Medicaid or Medicare options. Medicaid helped keep the number of uninsured Americans low when it first initiated in 1965. Nonetheless, unemployment led to many uninsured individuals who could not be covered by Medicare or Medicaid. Once the country went from manufacturing to service-oriented jobs, many were unemployed, worked only part-time, and received lower pay. Bodenheimer and Grumbach (2012) note "Between 1980 and 2006, the number of workers in the manufacturing sector decreased by 30% while the number working in the service sector increased by 75%. From 1957 to 2000, the percentage of workers with part-time jobs-generally without health benefits-increased from 12% to 21%." Poor benefits were also a consequence as fewer employers could afford to provide private insurance entirely and employees could not afford premiums (Bodenheimer and Grumbach, 2012, p 17). More people were insured during the 1980's; however, in 2009, during our last recession, the number of uninsured nearly doubled. In terms of race, the Latino population has the highest rate of uninsured persons at 32%, followed by African Americans at 21%, and non-Hispanic whites at 12% (Bodenheimer and Grumbach, 2012, p.20). The high number of uninsured drove health care costs up, something detrimental to Medicaid.

Medicaid is an insurance funded federally and by the state through tax dollars. It is for certain income groups, primarily certain groups that meet a set criterion or are below a set poverty line. One of the set criteria is that pregnant women whose family income is at or below 133% the federal poverty level is required to be enrolled in the state's Medicaid program (Bodenheimer and Grumbach, 2012, p 12). For Wisconsin, it is called BadgerCare. Not all poor people may qualify yet all tax payers contribute to Medicaid. In general, the healthier and wealthier cross subsidizes health care for the poorer and sicker on Medicaid. Also, if not all poor

qualify for Medicaid but become qualified, say after becoming pregnant, it is likely that the pregnant woman will be seeing a caregiver for the first time in a long while, especially if she was never insured or able to afford care before. By then, the woman may have infections, a poor diet, or other issues that will impact her pregnancy. The text *Understanding Health Policy* notes: "…the federal contribution is greater for states with lower per capita income" (Bodenheimer and Grumbach, 2012, p 12). Wisconsin is one of these states with a per capita income of $27,192 as of 2011 ("U.S Census", 2011). The access ought to be available considering Wisconsin should be a state with a high Medicaid budget, yet it lacks necessary programs and is a host to many shocking rates such as infant mortality. "Medicaid pays physicians an average of 72% of Medicare fees, the majority of adult primary care physicians limit the number of Medicaid patients they will see" (Bodenheimer and Grumbach, 2012, p. 13). Additionally, Medicare and private insurers pay physicians more so, fewer physicians accept Medicaid patients. The issue goes beyond coverage especially for pregnant women. It becomes an issue of a high population with Medicaid and not enough care to match.

Between 2000 and 2010, Medicaid enrollment grew from 32 million to 50 million enrollees (Bodenheimer and Grumbach, 2012, chap. 2). This high enrollment is correlated with unemployment and thus, leads to a higher patient to caregiver ratio. In other words, this would explain the crowded waiting rooms and less quality time with the caregiver. Compared to those who are privately insured, Medicaid patients have lower rates of crucial things such as immunizations, hypertension and diabetes control-both that can lead to preterm birth, and timeliness of prenatal care (Bodenheimer and Grumbach, 2012, p. 23). Many studies have shown that certain racial groups get less care. Latinos and blacks receive fewer services than whites even when they have the same income and health insurance (Bodenheimer and Grumbach, 2012,

p. 26). It is important to keep in mind, African-Americans are already less likely to have an annual check-up than its counterparts. There is no explicit explanation for this disparity except that unconscious racism is being inferred.

As mentioned earlier about Milwaukee, reporter Crocker Stephenson believes overall access is not as significant as the issue of dental care (C. Stephenson, personal communication, July 8, 2013). He emphasizes that any woman in Wisconsin can receive health care. The issue is getting them to seek the necessary prenatal care. Obstacles such as finding Medicaid-accepting caregivers and then taking the chance of waiting too long to see a doctor may be confronted. The factors that involve issues of access to health care based on the type of insurance a pregnant woman holds are only a minor part of Wisconsin's overall political spectrum that must change regarding health policy. In other words, the issues that need to be addressed are much more profound than the obvious. Today in Milwaukee minor issues are being addressed the Stephenson considers "downstream issues" such as prenatal care, eating healthy, and not smoking. Upstream issues are yet to be addressed to impact later generations and to maintain a lower infant mortality rate in the future. These upstream issues are those to be prevented for the long-run such as employment, better living conditions, and a more organized health policy. These are broader social and economic policy interventions. These problems arouse with deindustrialization and white flight into the 1970's thus making segregation more pronounced. The prevailing social hierarchies and oppression in Milwaukee is causing too much stress and thus, is the main factor to blame for the city's impoverished health.

High infant mortality rates are associated with costs of prenatal care, pre-term birth complications, and even costs for special education. It is easy to conclude that most of Milwaukee's health expenditures are towards caring for the health and educational effects of

prematurity. As of 2006, the annual cost for premature birth is $26.2 billion. This price includes care for a preterm birth such as NICU care and also includes future issues prematurity leads to such as cerebral palsy, mental disabilities, impaired vision, and hearing loss (Johnson & Boulton). According to the *Milwaukee Journal Sentinel*, prematurity cost BadgerCare $81 million in the 2010 fiscal year (2011). These costs are extremely detrimental to the Milwaukee community. In addition, the high costs become part of a burden to employers who can barely afford coverage for its employees already. In 2009, Medicaid expenditures totaled $374 billion (Bodenheimer and Grumbach, 2012, p. 10).The shocking expenditure becomes a cause of higher health care costs eventually covered by the healthy insured. Infant mortality again is an issue in Milwaukee that must be addressed as it impacts. The spent money due to preterm births is an expenditure many may not acknowledge. Mitigating stress, which would help decrease preterm births, and thus lower the Milwaukee infant mortality rate, can eventually lead to more investment on health programs, education, and higher wages in the job market. It is important to improve policies and reverse the harsh effects of deindustrialization. The consequences of deindustrialization including high unemployment, poverty, and higher crime rates are factors of stress. The stress then manifests itself in poor behaviors or physiological effects that lead to premature births and higher infant mortality rates.

Costa Rica

Costa Rica has a population of over 4 million people with several different ethnic groups including whites and mestizo 94%, Amerindians (indigenous) 1%, Chinese 1%, Blacks (afro Costa-Ricans, west Indians, Jamaican immigrant workers) 3%, and mixed group 1% ("IndexMundi", 2013). It is a developing country that lacks full economic stability but it continues to rely on its industries involved with agriculture and textiles. It is unique to other

countries that are considered developing countries due to Costa Rica's recent improvement. Although Costa Rica lacks economic development, it has gradually developed social stability since it became a more liberal country post-1970 ("Ministerio de Salud," 2013). This improvement is evident in Costa Rica's improved universal health care and its lowest infant mortality rate in history (Diario Digital Nuestro Pais, 2013). A study conducted several decades ago notes the economy did not delay the decrease of infant mortality rates 1910-1949. The study states: "In 1949, foreign trade reached the level observed in 1910: about US $200 per capita. Despite economic stagnation from 1910-1949, mortality rates decreased substantially during this period." (Rosero-Bixby, 1986). The globally-affecting recession in the early 2000s should also be considered since the decline in infant mortality rates occurred during the same time, again supporting the notion that causes and solutions may go beyond economical means. Considering the slow economic development yet a developed social stability, examining Costa Rica's approach to combating high infant mortality rates can be informative and beneficial to Milwaukee. It also supports my hypothesis revealing new factors that will prove infant mortality rates can be reduced by addressing socioeconomic factors and stronger social policies.

Costa Rica's universal health care, high literacy and education rates, and industrial jobs have contributed to an improving country becoming developed in the late 1970's (Rosero-Bixby, 1896). Its universal health care has been improved since it discriminated against immigrants and Costa Rica's indigenous people prior to the 1970's. Now it covers all of its inhabitants without any regard to ethnicity ("Ministerio de Salud," 2013). Further, Costa Rica's inhabitants receive social security; it has political stability, no army, and policies that promote cultural/racial homogeneity such as its universal health care and equalities to its various immigrants especially from Nicaragua. The improvement is evident after analyzing a decline in infant mortality rates

due to addressing various social factors. For background purposes, examining the infant mortality rates in Costa Rica throughout the years is vital. According to a study by Luis Rosero-Bixby (1896), infant deaths were a significant public health concern in the 1960s. In 1970, Costa Rica's infant mortality rate was 68 deaths per 1,000 live births. By the 1980's the rate dropped to 20 deaths per 1,000 live births. The rate continued to decline thereafter, reached a short increase, then another increase in 2010. The decline was in fact the greatest as the study notes the decrease from 1972 to 1980 was six times the decrease rate in 1955-1972. Today, Costa Rica's infant mortality rate is the lowest in history and the reason dates back to the 1970's.

Costa Rica's social development has contributed to declining infant mortality rates. In the 1970's, many public health programs were implemented. Programs included breast-feeding promoting campaigns, immunization programs, fumigation, professional human rights activists available as a resource to the public, and an extensive strategic national plan promising maternal and infant health for all ("Ministerio de Salud," 2013). Programs addressed most causes of infant mortality for Costa Rica. These causes were once diarrheal diseases, respiratory or gastrointestinal infections, and many preventable diseases. Immaturity, vaccinations for preventable diseases, and more prenatal care that resulted in more frequent diagnosis and treatment were all addressed with these programs which contributed to the decline. Prior to the 1970's programs, a study explains an attempt to decrease fertility rates; not necessarily to keep the number of children women birthed low, but to space out births through educating women on options for birth control (Rosero-Bixby, 1986). The study supports this as it states: "…a short birth interval leads to a probability of dying that is four times greater than an interval of at least 2.5 years" (Rosero-Bixby, 1986). A reduction in fertility did occur and consequently, a reduction in births, which represented 24% of the decline in the infant mortality between 1960 and 1977.

Over the years the rate fluctuated until reaching its first lowest rate in 2009 of 8.84 deaths per 1,000 live births, according to "El Ministerio de Salud", that is, Costa Rica's health ministry. Succeeding the lowest rate in 2009, a gradual increase appeared at 9.46 deaths per 1,000 live births and 9.07 deaths per 1,000 live births thereafter.

Costa Rica's Health Ministry is an organization that acts as a liaison between health care workers, scientists, investigators, and the public in general. The ministry promotes health with a focus on communities advocating societal participation under the principles of transparency, equality, solidarity, and universal care. The universal health care became the best of all Latin American countries after Costa Rica's health care reform in the 1990's (Acosta & Bermúdes &Rocio Sáenz, 2010). There is private care available that consists of government owned insurance companies along with private hospitals in what Costa Rica calls its "suburbs." The public health care is known as Costa Rica's Social Security. Those who can contribute to social security are employers, the state, and individuals contributing an amount that depends on how much each can give. For example, if an individual can contribute 22.91% of its salary, the employer will contribute 14.16% and the state 0.50% (Acosta & Bermúdes &Rocio Sáenz, 2010). Those who cannot contribute because they live in poverty are provided with provisionary access like emergency room services and primary care (Acosta & Bermúdes &Rocio Sáenz, 2010). Nonetheless, health care in Costa Rica is all integrated; there is no separation based on types of insurances or needed services. In efforts to return the infant mortality rates to a decline, new measures were taken. Efforts included: providing universal health care coverage, private or public, regardless of ethnicity or migration status, and acquiring high technology such as modern information holding systems to avoid paperwork. In addition, high technology systems of observation that provides access to very real and recent statistics. A national plan to ensure

health for the mother and baby has also been implemented. This plan will address prenatal care, educating women and increase female literacy, providing vaccination programs for the mother and baby, and promoting breastfeeding.

According to a study by the International Health Central American Institute Foundation and Harvard School of Medicine (Arias & Tristan, 2000-2001), one unique risk for maternal health in Costa Rica is pesticide exposure. As previously mentioned, agriculture prevails profoundly as a means for the economy in Costa Rica; therefore, many women, especially indigenous, are exposed to the pesticide while working and the inhalation of it can lead to issues transmittable to an unborn baby. The Health Ministry addresses this issue within their efforts of promoting prenatal care and with its program that made human rights activists available as a resource to the public. Further efforts by the Health Ministry involved creating a system that allowed health experts to find determinants and causes of death in order to take corrective action in advance, having periodic supervision on public and private health services, and lastly, interpreting infant mortality in dimensions of biology, the environment, socioeconomically, and culturally.

Infant mortality causes before the 1970's such as diarrheal and preventable infections were addressed, but different common causes prevailed by the 21st century. These issues included congenital malformations of the circulatory and nervous system and respiratory issues during the perinatal period ("Ministerio de Salud," 2013). In 2010-2011 there was an increase of congenital issues while respiratory issues declined simultaneously. The efforts by the Ministry would address many of the newer efforts if not immediately, over a period of time. Nonetheless, results were evident as soon as 2012 when Costa Rica's infant mortality covariates reached a new historical low rate of 8.51 deaths per 1,000 live births. Although concluding that the efforts

of the Health Ministry may seem like a quick generalization and there are no proofs that directly correlate the new rate with the social efforts, they were big measures that certainly made a difference.

Overall factors like universal health care allowing for less disparities between racial groups and a stable political system may also be worthy of accrediting for the declining rates. Analyzing the circumstances in Milwaukee and comparing them to Costa Rica's may help reveal what approaches may be important towards the efforts of declining infant mortality rates. Clearly a comparison of a city to an entire country may offer some ambiguity in the findings; however, rates for Costa Rican cities are still lower than Milwaukee's for all but one city. Limon had the highest infant mortality rate of 10.54 deaths per 1,000 live births, beating Milwaukee's rate, while Heredia had the lowest at 7.57 deaths per 1,000 live births. It should be noted that these rates comes from only seven of Costa Rica's cities with available data.

Milwaukee & Costa Rica compared

Milwaukee and Costa Rica's infant mortality rates were close in the 1970's and not at their highest. However, in the 1970's and into the 1990's, infant mortality rates rose for both regions. In Milwaukee, industrialization became devastated when companies shut down, sold, or outsourced their businesses. Consequently, jobs were lost and the economy was affected. Higher unemployment led to poverty, worsened living conditions, violence, and bad behaviors such as smoking, alcohol, and drug use. This deteriorating society was mirrored in rising infant mortality rates with premature births as the primary cause. Premature births are caused primarily by stress. The stress in Milwaukee is triggered by factors like violence, struggling to make a living, single parenting, and even racism. As a result, African Americans end up with rates three times as high as whites and almost twice as much as Costa Rica's rate. Deindustrialization not only caused bad

behaviors, but also physiological changes in poor mothers due to high cortisol levels leading to premature births.

Race/Ethnicity

The significant disparity for infant mortality rates in Milwaukee makes it a concern beyond health reasons. It is a reason of race. In contrast, Costa Rica does not have racial problems although this may be due to only 1% of the population being considered Indian, Black, and Chinese (Acosta, Bermúdez, Sáenz, 2010)(Costa Rica News, 2013). Costa Rica is homogenous culturally and racially mainly sharing a unique whiteness its inhabitants share. Older conservative Costa Ricans look down on others who have darker skin more so because of pride rather than social factors, but not as bad as neighboring countries (Costa Rica News, 2013). Overall, Costa Rica has social stability for all of its civilians. The Health Ministry explicitly declared its universal health care to guarantee attention to pregnant woman regardless of her ethnicity, or immigration status and health coverage of public and private services throughout the country ("Ministerio de Salud," 2013). Not only is race a stress trigger that is not a concern in Costa Rica, but there are also no barriers to health access based on race.

Not so much the economy to blame

Milwaukee is relatively segregated and suffers racism. This trait is seen as a trend rather than an actual cause of infant mortality. According to Stephenson, poverty is to blame for high infant mortality rates. Low socioeconomic status leads to psychosocial effects like stress and shame. The status determines the environment, nutrition, and overall stress. African-Americans had the highest poverty rate of 25.8% in 2009, not to mention, they live in a city ranked fourth poorest in the country ("U.S Census," 2011-2012). Milwaukee's high risk zip code alone had a poverty rate of 39.17% and 95.10% for African Americans in that area. Poverty may be part of

the issue as it is definitely a stress trigger especially amongst the African American population, but Costa Rica is economically underdeveloped so other themes were explored. In Milwaukee, African Americans have high rates in other themes like incarcerations and single parenting. Incarcerations are almost more than half for African American men while the rate is about 314 out of 100,000 in Costa Rica. A study from the SDC (2012) actually found that about two-thirds of these men come from one of the top poorest zip codes including 53206, an area with one of the highest infant mortality rates. Socioeconomic status has been associated with high infant mortality rates as if it is the main contributor when in fact it is the factors that are a result of low socioeconomic status.

Family connectivity

Incarcerations break families apart, leading to a high amount of single-mothers. According to Adams, infants whose birth certificates lack paternal information have higher infant mortalities than infants of woman who are not married but have the name of the father on the certificate (Adams et al., 2009). Family connectedness was found to be a potential factor contributing to the predictability of infant survival. African Americans tend to live more isolated than Latinos. Many African Americans living in unstable conditions are transient and move home to home often so their children are not brought into a community. There is more connectivity amongst Latinos where the support of extended families is available and babies tie the families closer together. This embedding is also true in Costa Rica, as family ties are very strong from moment of birth to death. Interestingly enough, there is a high amount of single-mothers in Costa Rica. It seems that social stability and support matters the most in influence on infants. In Costa Rica, other relatives take the father role or help nurture the baby. In Milwaukee, many African American women, not Hispanic, do not have this community element. Costa

Ricans are more autonomous in their ways as they are conservative and mainly Catholics. Culture is related to the family-like support necessary. Most Costa Ricans live at home until they are married; thus, more extended families prevail. To leave for college or gain independence is rare ("Costa Rica News," 2013). Even cultural habits within the family can be an impact.

Breastfeeding

I decided to examine breastfeeding because it was one factor of many that improves infant's health. Additionally, I found that one of the initiatives by the Costa Rican Health Ministry that contributed to lower infant mortality rates was a program promoting breast feeding. Breastfeeding was an issue for many mothers as many associated it with a social stigma. Campaigns for breastfeeding increased the rate of mothers who lactated from 10% in 2008 to 53% in 2011. In Milwaukee, I asked Stephenson if there are different rates of breastfeeding among different groups based on socioeconomic status or race. Although he did not know if rates differentiated, he mentioned "many black women are just grossed out by the idea of breastfeeding. I don't think there is a stigma because I know it is not stigmatized nor an issue in the south (where infant mortality rates are the highest in the nation)" (C. Stephenson, personal communication, July 8, 2013). Stephenson elaborated and said "There's something very primitive about breastfeeding. Breastfeeding actually has a high correlation with sleep-related deaths and is a number one risk factor. All but one of the baby cases I studied (of sleep-related deaths), had a mother that breastfed" (C. Stephenson, personal communication, July 8, 2013). This is an important issue. First, an infant that is breastfed will grow and develop at a healthier and possibly quicker rate than an infant who is not considering all other factors are fair. Therefore one would suggest breastfeeding needs to be strongly promoted. However, Stephenson's statement reveals a paradox between breastfeeding, a healthy practice, and sleep-related deaths. Since there are many sleep-related deaths, perhaps the problem is not that women

are not breastfeeding. Instead, the problem may be that they are breastfeeding while other risk factors are occurring, such as feeding on a bed or couch with too many pillows, or mothers fall asleep while breastfeeding

Access to health care

Health care policy was worth analyzing considerably for Milwaukee and Costa Rica. Many of Milwaukee's high-risk neighborhoods are almost directly next door to hospitals or clinics. I asked Stephenson to explain this paradox and he simply responded: "This really shows that the problem is not about access to care. It has a lot to do with stressors in society" (C. Stephenson, personal communication, July 8, 2013). As I mentioned earlier, all pregnant women have health coverage by law through Medicaid. Issues regarding access arise mainly for women who are seeking care for the first time or who lack autonomy and allow physicians to make health decisions. There may also be reluctance in culture. Nonetheless, the biggest concern is finding health facilities that take Medicaid patients efficiently. By efficiently, I mean in a stress-free manner where women will not struggle waiting long in waiting rooms because the doctor to patient ratio is large. Also, a system that is nondiscriminatory making Medicaid patients feel less privileged of health care than those privately insured can help provide care for more mothers in efforts to lower infant mortality rates. Costa Rica's universal health in addition to social programs such as the breastfeeding campaign was mainly to blame for the declined infant mortality rates.

Costa Rica took what DeLAET would consider PPP (Public-Private Partnerships). These partnerships are between government and private sector collaborations involving government funding to private actors to implement specific programs or services intended to provide public goods (DeLAET, D.E. & DeLAET, D.L. 2012, p. 15).This cooperation is still a far reach for Milwaukee. Stephenson mentions we have much more work to do. It is great that Tom Barrett

took up this issue, as it is one that is politically weak; it shows a lot of leadership, but the Milwaukee Health Department can do better. He states: "We have so much money coming into the city for this issue, but programs are stagnant because there's a huge fight over its control. There was money given for infant mortality efforts for example BMO Harris Bank and United Way, however they have helped with medical related programs like vaccination program and prenatal care. This attacks downstream solutions not upstream problems" (C. Stephenson, personal communication, July 8, 2013). Politics are prioritized, and consequently, so is the power over such money.

CONCLUSION

What has been done?

Milwaukee has addressed downstream interventions rather than broader social, environmental, and economical interventions. City officials such as Mayor Tom Barrett and Commissioner Bevan Baker have continued to promote healthy infant care through the "Strong Baby" campaign and crib drives. The Milwaukee Journal Sentinel continues to raise awareness of the city's high infant mortality rates through its "Empty Cradles" series. Further, community efforts are taking place through the Black Health Coalition and UW-Milwaukee's School of Public Health. These efforts are important, but Milwaukee needs emphasis on better health policy interventions and a focus on education and jobs. Political infighting has prevented Milwaukee leaders and state leaders from quickening progress and lowering infant mortality rates. In Costa Rica, policy intervention began to improve infant mortality rates along with their health reform in the 1990's. The Costa Rican Health Ministry first addressed preventable infant mortality causes with vaccination programs, breastfeeding campaigns, and sanitation. It continued with improving its universal health care which covers all of the country's inhabitants regardless of class, ethnicity, and immigration status. It continues to enforce policy interventions

to keep its infant mortality rate low by addressing rising crime rates, striving for advanced medical technology, and promoting proper prenatal and postnatal care. Today, Costa Rica is the top Latin American country with the best health care and social stability even though, its economy stability lags.

What needs to be done?

We need more social sensitivity, especially from politicians. Costa Rica concentrated on societal aspects when addressing its high infant mortality rates and accomplished a declining rate over the years. Milwaukee continues to push for safer sleeping habits and to decrease bad behaviors such as smoking, as much as possible. Nonetheless there are many more issues to be addresses. In reality, there is a need to address healthier communities for example, promoting proper health care early on in lives. When an expecting mother is seeing a doctor or dentist for the first time, a deficit has already been created for the child whom continues to wheel the ongoing vicious cycle. It will take generations to completely solve the issue in Milwaukee as it took Costa Rica decades. According to Stephenson, "just by eliminating co-sleeping and other bad sleeping habits with an infant, we can reach the desired goal of decreasing rates by 15% for African Americans" (C. Stephenson, personal communication, July 8, 2013).

But these are only primary steps. In New York, rates were lowered from 27 deaths per 1,000 live births to 6 deaths per 1,000 live births over ten years (C. Stephenson, personal communication, July 8, 2013). During the New York project, every factor was considered including the fuel contaminating the air. Milwaukee must work harder and address these profound factors in addition to those already addressed. We can only build healthier communities. The immediate intervention people are aiming for is not a way to address the issue. Mothers need to be educated, African-American men at risk for incarceration needs to be

considered to reunite families, and jobs need to be reconstructed. These social factors are crucial and possible as proved by Costa Rica.

Why does it matter?

Aside from decreasing Milwaukee's shocking infant mortality in regards to recovering its public health, it is also important to address problems now to avoid more detrimental results in the future for African-Americans and other communities in Milwaukee. For example, the Hispanic population in Milwaukee currently ranks right after African Americans in infant mortality rates. Many of the high risk neighborhoods foster Hispanics, some with higher poverty rates than African Americans but lower infant mortality rates. There are also more uninsured Hispanics than African Americans. Infant mortality rates are not affecting Hispanics as bad because they tend to have more community as mentioned in the "family connectivity" section. This is not to say the Hispanic population will not reach this point if factors are not acknowledged early enough. High infant mortality rates begin to appear generations later. Stephenson justifies this explaining that once immigrants get to the U.S, bad eating habits happen, communities begin to break apart, language barriers become a stressor, and discrimination occurs. Circumstances change for women that impact their health such as enduring new perceptions and new stressors (C. Stephenson, personal communication, July 8, 2013).

Currently

Costa Rica continues its efforts in maintaining social stability which has contributed to reaching its lowest infant mortality rate in history as of 2013. Milwaukee is taking many measures in addition to the "Strong baby" campaign, Cribs for Kids drive, "Empty Cradles" series, and others. In high-risk zip codes for example, different programs concentrate more on these areas by assigning visiting nurses. Children's Hospital is working on analyzing the

frequency of co-sleeping. Also, UW-Milwaukee's new Peck School of Public Health is training many in public health. One of the school's missions is to address maternal health in the city of Milwaukee.

My findings hopefully revealed the necessity to address poor living circumstances, the need to empower women to become a part of their health decisions, to raise awareness within health care providers in the stress and inequality they may provoke, and to look at ways where families can be reunited and communities reconstructed. It is also important to provide hope by analyzing successful approaches like those in Costa Rica, a developing country with less social and economic capital.

Closure

Analyzing another region with similar rates to Milwaukee can help identify new factors shared that we have not yet considered. Looking exclusively at factors such as, poverty, living conditions, and health access may generalize reasoning behind high infant mortality rates. There is evidently a need to recognize deeper factors that apply to the entire affected community. Since its recent development and advancements, Costa Rica's rates have been associated with developed countries more than developing (Arias & Tristan 2000-2001), as it is used in a comparison here. Milwaukee, on the contrary, matched closely with Costa Rican infant mortality rates in the 1990's but has escalated in successive decades while Costa Rica's rated dwindled. Costa Rica's causes of infant mortality today include congenital malformations of the circulatory and nervous system and respiratory issues during the perinatal period. They are addressed with working health policies such as universal health care, social stability through community efforts such as those by the Health Ministry, and a homogenous population, all elements Milwaukee cannot identify with. Milwaukee's infant mortality rates are caused by premature births,

SIDS/SUDI, and congenital abnormalities in descending order. These causes are mainly caused by societal factors that trigger stress. These social factors must be addressed through new health policy interventions. My first hypothesis declared my attempt to control for race to reveal new contributing factors. I presumed that controlling for race would be inevitable and I was right. Looking at Milwaukee's racism and discrimination as a contributing factor towards infant mortality makes the homogenous population in Costa Rica a highlight. It is mainly a highlight in it universal health care access provided to all equally while in Milwaukee, inequalities are endured within health care venues, especially for Medicaid patients. My second hypothesis stated that infant mortality in Milwaukee is due to preventable causes. This hypothesis was correctly proven considering the social factors contributing to the three main causes, especially premature births triggered by birth. The efforts conducted and in the process are good foundations to really speculate the personal struggles Milwaukee women, especially of African American backgrounds, are undergoing all because of today's cumbersome society. Such efforts will hopefully ignite the drive towards social stability similar to that demonstrated by Costa Rica.

APPENDIX

~Glossary

Population below poverty line: National estimates of the percentage of the population falling below the poverty line are based on surveys of sub-groups, with the results weighted by the number of people in each group. Definitions of poverty vary considerably among nations. For example, rich nations generally employ more generous standards of poverty than poor nations. ("IndexMundi," 2013). Poverty rates in developing nations are defined by the World Bank as extreme poverty (less than $1.25/day) and moderate poverty (less than $2/day). The U.S has an

absolute measure which according to the U.S census, describes poverty being below the threshold, which changes along with prices ("U.S Census," 2011-2012).

Public Health: a multidisciplinary approach to health that is concerned with the health of specific communities and populations, emphasizes the socioeconomic determinants of illness, and prioritizes preventative care (DeLAET, D.E. & DeLAET, D.L., 2012, p. 4)

Infant Mortality: the probability of a child born in a specific year or period dying before reaching the age of one, if subject to age-specific mortality rates that period. ("CDC," 2012).

Congenital abnormalities or birth defects: a structural abnormality present at birth (Adams et al., 2009)

Preterm birth: a delivery or birth at a gestational age less than 37 weeks (Adams et al., 2009)

SIDS/SUDS (Sudden infant death syndrome/Sudden unexpected death in infancy): Sudden death of an infant under one year of age, which remains unexplained after the performance of a complete postmortem investigation, including an autopsy, examination of the death scene, and review of the case history (Adams et al., 2009, p. 219)

Social Stability: exists when groups or groups are able to function in society normally based on steady circumstances regarding housing, residential transition, employment, income, incarceration, and partner relationship (German and Latkin, 2012).

Figure A: Strong Baby Campaign (2012) by UW-Milwaukee School of Public Health and Milwaukee Health Department

Figure B: City of Milwaukee Safe Sleep Campaign by Milwaukee Health Department (2012)

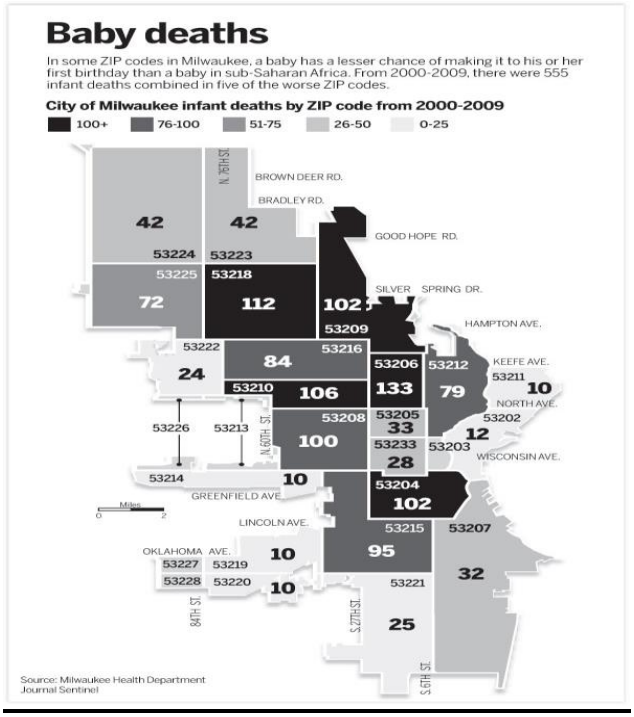

Figure C: Milwaukee Journal Sentinel. This shows the high-risk zip code areas in Milwaukee with the highest infant mortality rates in 2000-2009.

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